



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,761	09/29/2003	Laurent Lefebvre	00100.02.0046	1469

23418 7590 03/22/2005

VEDDER PRICE KAUFMAN & KAMMHOLZ
222 N. LASALLE STREET
CHICAGO, IL 60601

EXAMINER

NGUYEN, HAU H

ART UNIT PAPER NUMBER

2676

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/673,761

Applicant(s)

LEFEBVRE ET AL.

Examiner

Hau H Nguyen

Art Unit

2676

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 20-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 20-22, Applicant has claimed "and the to a second reservation station," which fails to point out the claim subject matter.
3. Claim 19 recites the limitation "the vertex command thread", and claim 25 recites the limitation "the vector command." There is insufficient antecedent basis for these limitations in the claims.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1-2, 4, 8-11, 20-22, and 24 are rejected under 35 U.S.C. 102(a) as being anticipated by Lawless et al. (U.S. Patent No. 5,818,469).

Referring to claims 1, 8, 9, 20, and 22, as shown in Fig. 1, Lawless et al. teach a graphics application 101 is coupled to a graphics interface 103, which interfaces the application 101 or applications to an implementing hardware system 115 through a plurality of threads. The master thread 105, within the graphics interface, creates a plurality of threads 107, 109 (a first reservation station and a second reservation station), to be used for rendering. One thread is designated as the synchronizer thread 111 (an arbiter), which sorts the data streams from all of the threads into sequential order and communicates the resultant data stream to the hardware 115 (a command processing engine). Between master thread 105 and synchronizer thread 111 are connected, in parallel, a plurality of rendering threads 113 such as thread 107 and thread 109 (col. 3, lines 6-24). Lawless et al. further teach for each attribute command that is received, the master thread 105 updates the state of the master graphics context 106, flags the particular change, and places the command in a workgroup. At the end of a workgroup, the master thread 105 copies the attribute state that has changed within that workgroup from the master thread's graphics context 106 to a workgroup control block (col. 3, lines 57-64).

As for claims 2, 24, as shown in Fig. 3, step 314, Lawless et al. teach generating a done flag after all commands in the workgroup are executed.

In regard to claims 4, 11, 21, as cited above, Lawless et al. teach the synchronizer thread 111 sorts the data streams from all of the threads into sequential order and communicates the resultant data stream to the hardware 115, and thus it is implied that the commands are interleaved.

In regard to claim 10, Lawless et al. teach the graphics commands can be stored in any storage device (col. 5, lines 26-35).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lawless et al. (U.S. Patent No. 5,818,469) in view of Wyatt et al. (U.S. Patent Application No. 20040/041814).

Referring to claim 3, as cited above, Lawless et al. teach all the limitations claim 3, except that the arbiter retrieve the commands based on a priority scheme.

However, Wyatt et al. teach a method of processing graphics commands, wherein as shown in Fig. 1, comprises a plurality of queues 18-20 for storing assigned commands received from the threads A-C. Wyatt et al. further teach the queues are coupled to command parser 22. Command parser 22 fetches the commands from the plurality of queues. The command parser 22 can be configured to fetch commands based on an arbitration scheme in which certain queues have higher priority than others (paragraph 23, page 2).

Therefore, it would have been obvious to one skilled in the art to utilize the method as taught by Wyatt et al. in combination with the method as taught by Lawless et al. in order to synchronize instruction processing from multiple instruction queues (paragraph 1, page 1).

Art Unit: 2676

8. Claims 5-7, 12-19, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawless et al. (U.S. Patent No. 5,818,469) in view of Airey et al. (U.S. Patent No. 6,650,327).

Referring to claims 5-7, 12-13, and 23, as shown in Fig. 2, Lawless et al. teach the graphics subsystem 217 corresponds to the hardware 115 block illustrated in FIG. 1. Thus, Lawless et al. teach all the limitations of claims 5-7, 12-13, and 23 except that the graphics subsystem (command processing system) further comprises a texture engine, an ALU, and the reservation station is at least one of vertex reservation station and a pixel reservation station.

However, as shown in Fig. 2, Airey et al. teach a graphics system 111 (Fig. 1) provided with a graphics program 130 (Fig. 2) that operates on both vertex (or geometric) data 131 and pixel (or image) data 132. The process steps within the graphics program 130 consist of the display list 133, evaluators 134, per-vertex operations and primitive assembly 135 (a vector reservation station), pixel operations 136 (a pixel reservation station), texture assembly 137 (texture engine), rasterization 138, per-fragment operations 139, and the frame buffer 140 (col. 6, lines 42-48). Airey et al. further teach an ALU, which performs the arithmetic calculation from steps 131 to 139 of graphics program 130 (Fig. 3, and col. 8, lines 15-18).

Therefore, it would have been obvious to one skilled in the art to utilize the method as taught by Airey et al. in combination with the method as taught by Lawless et al. in order to preserve the precision of data in the frame buffer (col. 8, lines 36-41).

In regard to claims 14, 15, 18, 19, and 25, as cited above, Lawless et al. teach providing graphics commands to a first rendering threads and a second rendering threads and associated the commands into workgroup for future rendering (col. 3, lines 30-35); and also teach an arbiter

Art Unit: 2676

coupled to the rendering threads to provide graphics commands to a graphics processing engine; and further teach generating a done flag when all the commands in the workgroup are executed. As also cited above, Airey et al. teach a first reservation station 135 for performing vertex operations, and a second reservation station 136 for performing pixel operations. Airey et al. also teach an arithmetic logic unit (ALU) and a texture engine, and further teach for vertex operation (vertex commands), vertex data 131 are converted into primitives that are assembled to represent the surfaces to be graphically displayed (scan conversion), and for pixel operation, a pixel map processes the data from the processor to add scaling, for example, and the results are then either written into texture assembly 137 or sent to the rasterization step 138 (render backend) (col. 6, lines 57-67, and col. 7, lines 1-2).

Therefore, it would have been obvious to one skilled in the art to utilize the method of operating on both vertex data and pixel data as taught by Airey et al. in combination with the method of arbitrating graphics commands as taught by Lawless et al. in order to preserve the precision of data in the frame buffer (col. 8, lines 36-41).

In regard to claim 16, as cited above, Lawless et al. teach the selected commands may be interleaved.

As for claim 17, as shown in Fig. 3, Lawless et al. teach the selected command may be provided back to the thread it was previously retrieved (steps 314 and 304).

Art Unit: 2676

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hau H. Nguyen whose telephone number is: 571-272-7787. The examiner can normally be reached on MON-FRI from 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D. C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered response should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

H. Nguyen

03/15/2005



MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600